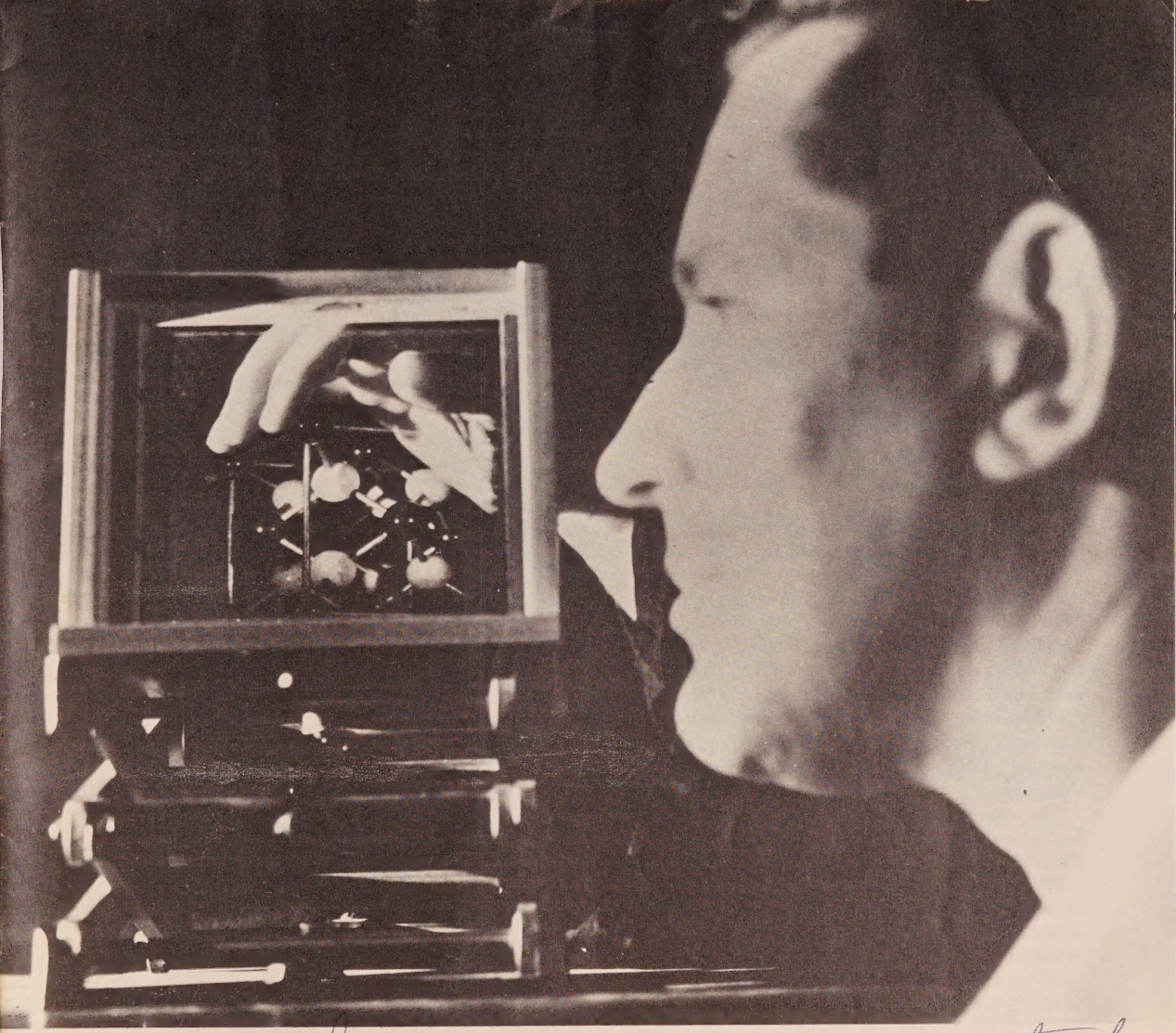


Steel Panelling Joe - Western Construction McNeil

TECHNICIAN ENGINEER

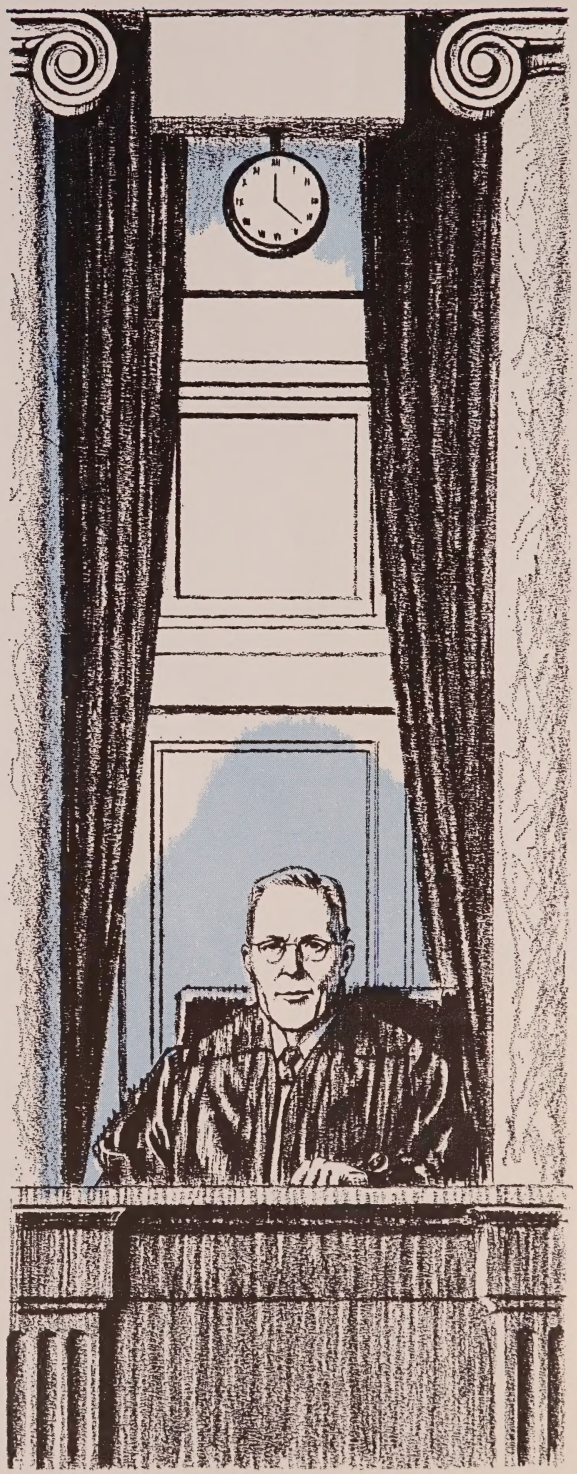
JANUARY, 1967

Published for the Employees of the Broadcasting, Recording and Related Industries

INTERNATIONAL BROTHERHOOD OF ELECTRICAL WORKERS — AFL-CIO

United States Supreme Court's SCHOOL DESEGREGATION DECISION

May 17, 1954



Often events not directly ascribed to the advance of labor have deep impacts and influences on the labor movement. Such was the result of the United States Supreme Court's decision on May 17, 1954. On that day the Court speaking through Chief Justice Earl Warren unanimously upset the "separate but equal" doctrine of the Court laid down in 1896. The Supreme Court had before it school cases from South Carolina, Virginia, Kansas, Delaware and the District of Columbia.

The cases were consolidated (except the D. C. case) and the Chief Justice said in Brown v. Board of Education (347 U.S. 483),

"We come then to the question presented: Does segregation of children in public schools solely on the basis of race, even though the physical facilities and other tangible factors may be equal, deprive the children of the minority group of equal educational opportunities. We believe that it does."

The District of Columbia case was somewhat different technically, but the ruling in the Brown case controlled and the result was the same — segregation was outlawed by the Court. The "separate but equal" theory was dead.

While the case, epochal in education, did not directly touch on labor, few events in our lifetime have motivated the drive to outlaw discrimination in employment to the same extent this ruling has in the decade 1954-1964. The effort to achieve economic parity, based on the philosophy and ruling of the high court has been a tremendous one and substantial progress has been made in the ten years since the decision. Although an educational case, its impact has the effect of being a great landmark of labor.

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TECHNICIAN ENGINEER

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the cover

Research in holographic techniques in the RCA laboratories is producing some interesting advances. On our cover, a laboratory technician appears to be holding a model of molecular structure in his hand behind an open frame. The framed image is actually a three-dimensional transmission hologram, and the frame its edge. The latest technique for producing three-dimensional images from a single negative, holography uses the coherent light of lasers to produce permanently recorded interference patterns. When illuminated by laser light either by transmission or reflection, holograms can show the scene or object from any perspective within the area of the negative. For details on this fascinating new technology, see page 4.

index

For the benefit of Local Unions needing such information in negotiations and planning, here are the latest figures for the cost-of-living index, compared with 1965: November 1966—114.6; November 1965—110.6.

commentary

In his December 30, 1966 evening news program, Edward P. Morgan had this to say about a rare opportunity:

In this corner I begin the 13th year of what I know to be one of the luckiest assignments in all journalism, electronic or otherwise, because of the precious freedom of expression it carries. As the AFL-CIO just indicated in that middle commercial, which it paid for, the rules have never changed from the start in January 1955: no censorship, just the right to speak my mind, if any. This is what freedom of the press and freedom of speech are supposed to be all about. What a pity it is that more sponsors and advertisers, more instruments in the whole orchestra of the information media do not encourage more responsible controversy and fair criticism even when it may be aimed straight back at them. It is not to tout this program as impervious to irresponsibility or unfairness that I say that, but to toast ABC and the AFL-CIO for their broad-mindedness.

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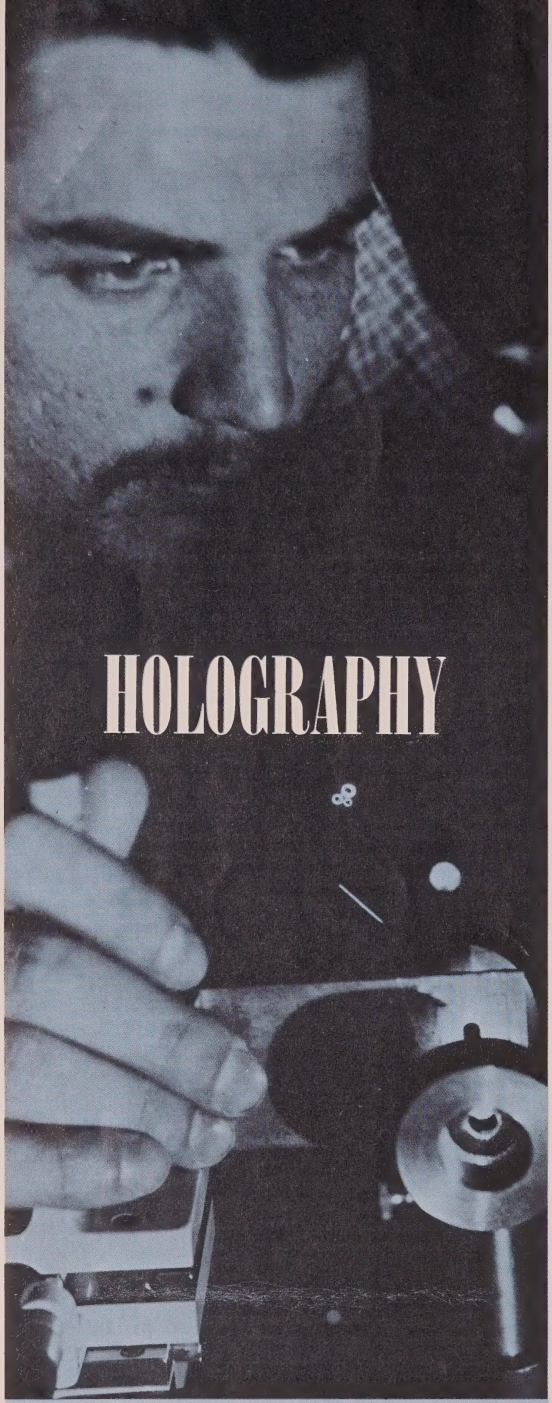


HOLOGRAPHY

Scientists are fascinated by the promise of wedding a relatively old optical technique to the laser light beam. The outcome is likely to be a practical, new way to record and study the world around us.

This new technology has excited the scientific world. We've reported previously on developments in the field, in the November, 1965 and March, 1966 issues. The following article, by RCA Laboratories' staff writer Bruce Shore, is one of the clearest and most comprehensive treatments to date.

IN A FEAT of cryptography as stunning in its way as the breaking of the Japanese diplomatic code on the eve of World War II, scientists have succeeded in cracking the phase "code" of light. Using the laser as an electromagnetic Rosetta stone, they have developed a new kind of photography that makes it possible to record an object or scene in all its colors and in all three dimensions. Not only that, but the resulting image, when viewed from various angles, undergoes all the optical variations associated with a scene as viewed through a window.

For instance, the background blurs when the eye is focused on the foreground and vice versa; objects behind structures in the foreground pop into sight when the angle of view is changed; the entire scene continues to be visible even when part or most of it is covered, just as it does in a window when the shade is pulled halfway down.

Dubbed *holography*, from the Greek meaning "to record everything," this new technology has already led the nation's major research laboratories to assemble small bands of mathematicians, physicists, and specialists in optics to conduct spoiling raids across its frontiers in search of new understanding and new applications of light.

From these forays eventually may come three-dimensional color movies and, possibly, TV, neither of which will require special glasses to be viewed; three dimensional photographs and paintings that occupy no more space than the two-dimensional versions we now hang; computer memories that store information in the form of light patterns registered not only on the surfaces of certain materials but in the bulk as well; devices that can store ultrasonic sound patterns in such a way that they can be read out with light after they have been used "to photograph" the interior organs of the body; other devices that can record X-rays and be read out with visible light in a magnification process which may make it possible to see atomic structure in three dimensions for the first time; new optical instruments for measuring air pollution in volume, for performing remarkably accurate analyses of objects under stress, and for doing contour mapping. The list of possible applications of holography grows longer and more fantastic every day.

The product of holography—called a *hologram*—is usually a large glass slide that is either completely transparent or slightly hazy. If hazy, further investigation under a high-powered microscope reveals that one side of the hologram has a peculiar graininess consisting of dark and light ripples scattered through it in ostensibly random fashion.

These curious patterns are actually frozen into a photographic emulsion that has been exposed directly to an object illuminated by a laser without the intervention

of a lens. Since even the eye sees nothing but a blur without its natural lens, it is surprising that the emulsion contains no recognizable image. What it does contain is a record in the form of microscopic particles of precipitated silver (produced via the same chemistry used to make conventional negatives) of where the varying intensities of light reflected from the object fell on it.

Holography depends upon the phenomenon known as optical interference, which was first explained in 1801 by the British physicist Thomas Young. Optical interference is the cause, for example, of the rich color patterns frequently seen on oil slicks and soap bubbles.

At the root of the phenomenon is the fact that light passes through space as a series of electromagnetic waves which tend to interfere with one another in random and uncontrolled fashion.

The light of a laser beam, however, is made up of waves of one frequency that are synchronized so that they move in uniform phase. This characteristic gives laser light a precision and coherence that is absent from ordinary light, and it makes possible a control over optical interference that is the basis of holography.

In holography, the laser beam is split in two. One beam is directed at the object to be holographed, while the second, or reference beam, is sent directly to the photographic plate. The first beam, reflected from the object toward the plate, undergoes changes in phase and intensity that do not affect the reference beam on its direct path.

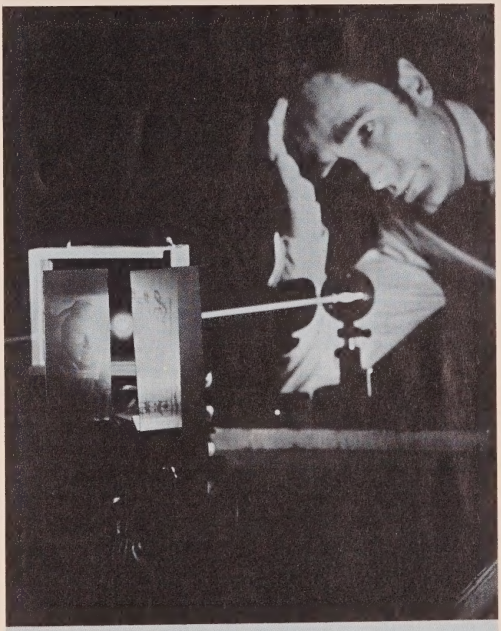
When the two beams meet again in the photographic emulsion, they interfere in such a way as to record not only the average intensity of the light reflected from the object, but also the direction of each wave in the light as revealed by the pattern of interference. The result is a hologram, a three-dimensional image registered in the emulsion in the form of changes in the spacing and density of the silver particles.

When the stored image is exposed again to the coherent light of a laser beam of the same frequency, the effect for the viewer is a reconstruction of the original object, apparently floating in space some distance behind the photographic plate and possessing all of its original dimensions.

Though holograms of complete images are new, holograms of single points of light go back to 1818 when the great French physicist Augustin Fresnel demonstrated what has since come to be known as the *Fresnel zone plate*. This is a glass plate on which narrowly spaced concentric circles have been scribed in accord with a highly precise formula. As a result, when an ordinary light beam of a single color passes through it, the beam undergoes interference so that a point of light can be seen to hover behind it in space if an observer looks through it toward the light beam. Thus, a modern hologram is really many Fresnel zone plates superimposed so that each produces its own point of light at its own unique focus, and all add together to form an image.

Even the idea of producing images—and vivid colors—by using the phenomenon of light interference is not new. It was first conceived by William Zenker, of Berlin, in 1868, and first demonstrated by the French photographer Gabriel Lippmann in 1891. What Lippmann did was to use a thin, transparent emulsion on a glass slide backed by a shiny surface of mercury. When light waves from an object to be photographed penetrated the emulsion and were reflected back by the mercury, they met and interfered with others just entering the emulsion. (This is exactly how an oil slick on water produces the interference colors we associate with it.) The result was a series of interference patterns trapped in the emulsion. These could be made to reproduce full, two-dimensional color images by the simple expedient of shining a strong white light on them at the proper angle. In fact, Lippmann photographs were the first true color photographs ever made from life.

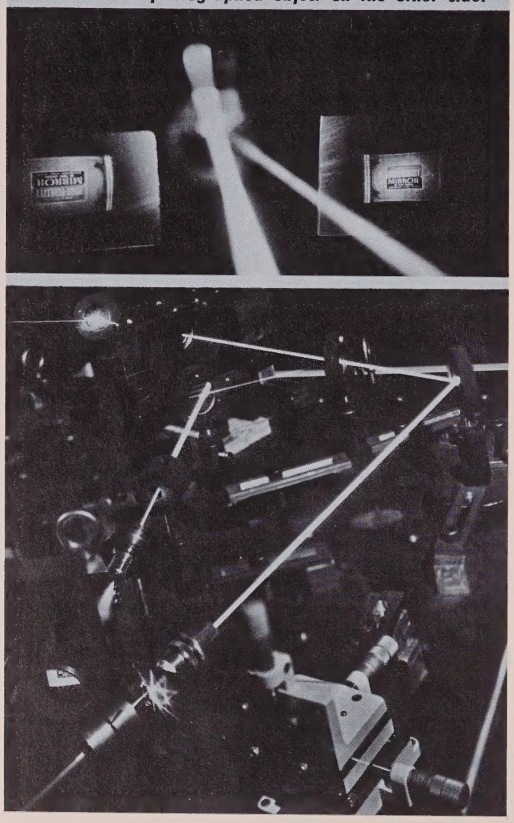
Once again, in 1934, the principle of light interference set the world abuzz with the development of the phase contrast microscope by Frits Zernike in Holland. For years, the study of biological specimens—human tissue, microbes, and other organic material—had been impeded by the fact that they were almost completely transparent to the eye of the microscope. Zernike found, however, that if the light being used were split so that a portion went through the specimen and another portion went through a transparent piece of mica, the two got out of phase and interfered when they were brought back together. The result was a high-contrast microscope for use in biological research for the first time. In 1953,



The photo on the opposite page shows an RCA researcher adjusting a lens to produce a hologram. Above, a red laser beam projects images of a Shubert figurine and a music sheet.

Thanks to RCA Electronic Age for story and pictures.

In the top picture, a reflection hologram is read by a blue laser beam. Reverse and real images of a film slide appear on either side of the laser beam. In the bottom picture a laser-holographic optical device caroms beams of light everywhere before a holographic image is formed, almost out of sight, at the lower left. The argon laser beam enters at top left, is split by a half-silvered mirror, upper right. One half of the light then goes, via a fully-reflective mirror, far right, to the back side of the photographic plate, and meets the light coming in from the photographed object on the other side.



Zernike won the Nobel Prize for this work.

The next major development in the use of interference phenomena was Dennis Gabor's concept of three-dimensional, holographic imaging propounded while he was working at the Imperial College of Science and Technology in London in 1947. He hoped to use the wave nature of electrons to create electron interference patterns from which he could reconstruct magnified images by optical rather than electronic means. Unfortunately, he could not get the necessary coherence in the electron beam.

There things remained until 1960 and the development of the first laser, a pulsed device made of a ruby crystal impregnated with chromium atoms. This was complemented later by the gas laser—a tube-shaped device that emits coherent light continuously.

Seizing on this development and improving on the concepts of Gabor by introducing the idea of a reference beam to create interference, Emmett Leith and Juris Upatnieks, working with a gas laser at the University of Michigan in 1962, produced the first hologram to give three-dimensional images. The scientific world has not been quite the same since.

Today, four years later, there is scarcely an electronics research laboratory not investigating the subject. At RCA Laboratories in Princeton, N.J., for example, scientists such as Drs. David Greenaway, Hendrik J. Gerritsen, and Edward G. Ramberg are exploring the feasibility of hologram computer memories that store information in three dimensions, hologram movies, and holograms whose images could be magnified in all three dimensions at the same time to father a whole new type of optical microscopy.

At the moment, however, the major aim of these scientists is to gain new and fundamental insight into the phenomenon of holography itself. In that connection, they have produced several novel forms of holograms: phase holograms that record their three-dimensional information on a mirror surface that is read by reflection, holograms whose images are read out in only two dimensions —like conventional photographs—but with the difference that such "snapshots" are only one-twenty-fifth of an inch on a side, and holograms that store not one but many images. Soon they plan to produce an improved "white-light" hologram—one made in laser light but one that can be read in ordinary daylight . . . a kind of Lippmann photograph in three dimensions.

The ability of holograms to produce standard photographs rests on the fact that they can be made to reconstruct two types of three-dimensional images: one, the so-called *virtual image*, appears only when you look through the hologram in the general direction of the read-out laser beam; the other, called the *real image*, is seen on the other side of the hologram and may be recorded in two dimensions by the simple expedient of inserting a screen or photographic plate in the path of the light.

The ability to produce color holograms in three dimensions visible in ordinary light depends on a surprising technique that employs the thickness of the hologram emulsion itself. Different-colored lasers—red, blue, and green—all illuminate the object to be holographed at the same time. The reference beam of each, instead of hitting the front side where the reflected beam is received, is directed to the back of the hologram. As a consequence, the interference patterns created by each are much finer and lie much closer together. If white light is now shone through the back surface of such a hologram, a full-color reconstruction of the virtual image results. This happens because the hologram acts as a color filter—it allows through only those frequencies composing the white light that are close to the ones used to record the image in the first place. So far, such holograms have shown certain drawbacks, however; they are dim and their colors are usually distorted.

With the invention of standard contrast photography by Louis Daguerre in 1839, man found a way to record, chemically, two-thirds of the graphic information encoded in light reflected from an object. Now, with the invention of holography, he has found a way to record the other third. In the process, his ability to investigate and portray the world around him has acquired—both literally and figuratively—a new dimension.

Labor's 1967 Objectives: Peace, Freedom, Progress For All the World's People

by **GEORGE MEANY**
President, AFL-CIO

The American labor movement, like Americans as a whole, looks toward 1967 in the same spirit, and with the same objectives, that have prevailed since leadership of the free world became this nation's lot a generation ago.

The objectives are peace, freedom and progress for all the peoples of the earth. The spirit is the blend of hope and determination that typifies America.

The great majority of Americans have learned the unwelcome lesson that the pursuit of peace, freedom and progress must sometimes be defended by force of arms. They have learned that this is so, not only when the United States is subjected to direct attack, but also when freedom anywhere is attacked. For to paraphrase a motto out of labor history, a loss of freedom for one is the concern of all.

Because of that concern, Americans are fighting a bitter war in Viet Nam, half a world away. They are fighting for peace—a peace that will guarantee to the people of South Viet Nam freedom to govern themselves as they choose, and to search for progress in their own way.

It is precisely that peace in South Viet Nam that President Johnson has been so earnestly seeking to achieve through negotiations with Hanoi. In this effort, as in all of his efforts to achieve peace and freedom for the people of that troubled land, the President has the heartfelt support of the AFL-CIO.

The stakes are far greater than South Viet Nam. By demonstrating its concern for freedom at so painful a price, the United States is preserving the peace, freedom and opportunity for progress, of scores of other small nations which otherwise could have become victims of Communist aggression. And by so doing it is helping to assure its own freedom, security, and chances for true peace as well.

Important as the war in Viet Nam is to the United States, it is not and cannot be the only war we wage. We must as well wage war against poverty and injustice, ignorance and discrimination.

In the last six years, America has scored substantial victories in this war but it is far from won. In truth, there is great danger now that America will move backward.

Already there are some who proclaim that this campaign to overcome America's social and economic problems must be suspended; that the cost of the Viet Nam war is too great to permit further progress toward a better life in America.

They are absolutely wrong.

To be sure, the war effort has top priority and nothing can be allowed to weaken it. But the United States is not faced—nor could it be faced—with a "guns or butter" choice. This country has ample resources to prosecute the shooting war and still combat the shortcomings of our own society.

A retreat now—a failure to appropriate the funds needed to implement the new legislation—would dash the hopes of those millions of Americans who have yet to rise from poverty, who are still denied full and equal opportunity. This America must not do.

We in the AFL-CIO intend to exert every force at our command to prevent such a retreat. We are confident that the great majority of Americans share our objectives and our determination that the struggle to reach them must continue with undiminished force. And we are determined that in 1957 we will continue to pursue America's indivisible goals of peace, freedom and progress.

Economics Not Politics May Be Chief Problem for 90th Congress

By Alexander Uhl

WASHINGTON, (PAI)—Right now most Americans are thinking of the upcoming 90th Congress in terms of politics. Yet with the arrival of January when the new Congress gets down to work, the big topic may be the state of the economy.

"Which way will it be going?"

Labor economists, on the other hand, are not happy with a 4 percent growth, nor do they feel that it is a good idea to cool off the economy at a time when unemployment is still running at almost 4 percent and more than 3,000,000 workers are jobless.

High interest rates—the highest that we have had for 40 years—still prevail although there are some signs that by next year the pressure on the money market may have eased somewhat. Meanwhile the building and construction trades are really hurting, the automobile giants are announcing cutbacks in production and buying power is dropping.

Workers have seen the gains of the past year all but eaten away by increases in the cost of living. One result has been the determination of organized labor to continue its flat rejection of the so-called 3.2 percent wage guidelines which have been used to block higher wage boosts wherever possible.

At the end of 1966 there were signs that not only was the 3.2 percent "guideline" collapsing but that even the Johnson Administration was beginning to prepare for an increase. Secretary of Labor W. Willard Wirtz began to defend wage contracts in the 5 percent range as noninflationary and there appeared a strong possibility that by the time the President gets around to his economic message to Congress, 3.2 will be officially dead and a higher figure substituted.

How much influence will Viet Nam exert on the economy in 1967? Unless there is a settlement of the war, it is obvious that the American taxpayer will be footing an increasingly high military bill. Despite the huge escalation of the war that has taken place in the past year, 1967 may see an even greater one. So far President Johnson has kept silent on the real cost of the war, but new budgetary estimates will be inevitable early next year, with the possibility of a tax increase.

On the other hand, should the war end would the American economy collapse? Secretary of the Treasury Henry Fowler has said that "nothing could be farther from the truth."

"We have many tasks waiting to take up the slack," he said recently. "The material and human resources now employed on nonproductive military work can play a far more productive part in the rebuilding of our cities, the expansion and improvement of our educational system, the exploration of space, the enlargement of our industrial plant, the improvement of our transportation system, the cleansing of our air and water, and a thousand-and-one other creative civilian projects."

This is the kind of talk that is sure to get the support of organized labor. In fact, labor has said repeatedly that our economy can afford not only to fight the war in Viet Nam, but to fight to defeat poverty at the same time.

Tied in, of course, with the problems of the economy and how to meet them will be the course taken by the 90th Congress. It will find on its doorstep a large backlog of unfinished business. The 89th Congress achieved an immense amount of work, but it left a great many things undone, nevertheless. These include:

- Completion of an updating of the unemployment compensation system, notably federal standards.
- An improved system of workmen's compensation, also including federal standards.
- Repeal of 14(b) which was choked off during the 89th Congress by the Dirksen filibuster.
- A common situs picketing bill, so urgently demanded by the building and construction trades.
- A truth-in-lending bill.
- Improvements in Social Security to bring benefits more in line with today's living costs.

All these are measures that labor has fought for. That they will be more difficult to achieve with the new Congress cannot be denied. Nevertheless, AFL-CIO President George Meany has made it perfectly clear that organized labor is not going to despair or sulk in its tent. He has conceded that undoubtedly the fight will be harder, but it will be waged, he has said, with full determination.

Already the AFL-CIO Committee on Political Education has sounded its war cry. In its latest memo to all affiliated unions and members, COPE says:

"The Time To Start for '68 Is NOW."

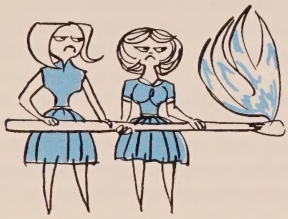
Analyzing the election returns, without pretending that the 1966 results were not a defeat for liberalism, COPE declares:

"The key lesson is that there can be no letup in politics, and that the 1968 elections started the day the 1966 elections ended. If that lesson has been learned, we can look forward for a comeback next time."

THE LABOR-MANAGEMENT WHIRL

As reported by Les Finnegan in CAVIL-CADE, *distributed by* Press Associates, Inc.

• *IN BOSTON, MASS., one of the world's foremost authorities on physical fitness and fatigue contended that industrial workers should have "chat breaks" in addition to coffee breaks. Dr. Peter Karpovich, of Springfield College, indicated boredom as the chief contributor to the fatigue frequently suffered by factory workers. "It is the nervous system that gets tired first," said Dr. Karpovich. "When work is not interesting, one may tire sooner than with work that is harder but more stimulating. This type of fatigue is really boredom, although you may feel physically tired." He praised coffee breaks as one means of relieving this tedium and added that occasional "chat breaks" would also dispel fatigue.*



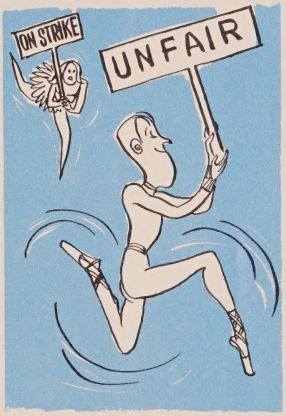
• *IN LONDON, ENGLAND, the hard-luck show of the current theatrical season is a musical called "Strike A Light" which the critics turned thumbs down on. To keep the show running the cast, including several Americans, voted to take sharp salary cuts. But maybe the odds were against it. "Strike A Light" was the second musical this year to be based on an 1888 strike of girls working in a match factory.*

• *IN NEW YORK CITY, the first strike of ballet dancers in U.S. history seemed a near-certainty, although neither the dancers nor management wanted to see a walkout occur.*

The dancers, all members of the American Guild of Musical Artists, AFL-CIO, voted unanimously to walk (or tip-toe) out of the American Ballet Theater. Claiming that it's impossible for them to live on current pay scales, the dancers pointed out that top performers, some with 20 years experience, have recently left the profession because of the low pay scales.

On the management side, Oliver Smith, director of the Ballet Theater, declared, "It's a crying shame we can't just give the dancers what they want. They deserve it." Trouble is, according to Smith, ballet never has and never will pay for itself and his group has run out of subsidies and endowments. Contributing to the dancers' discontent is the fact that they receive a minimum of $130-a-week "at home" in New York, and $142.50 on tour.

In contrast, stagehands average $185-a-week in New York and $300 on tour. Musicians are paid $215 in New York and more than $300 on tour. Said a union spokesman, "The stagehands and musicians deserve it, of course, but how many people come to the Ballet Theater to watch the stagehands and listen to the musicians?"



• *IN SCRANTON, PA., Pennsylvania AFL-CIO Secretary Harry Block told the story of the small manufacturing firm that hired an efficiency expert to try to speed up production. On his first day the efficiency man approached a supervisor and asked, "What do you do around here?" The supervisor replied, "Nothing."*

The expert then accosted another supervisor and asked, "What do you do around here?" The man answered, "Nothing." The efficiency wizard looked around triumphantly. "Just as I thought," he said. "Too much duplication!"

Computed Displays Give Blind

NASA and NAVY pilots are flying simulated missions today, and may be flying actual missions someday, without ever being able to see outside of their cockpits, or even needing to rely on traditional blind-flying instruments.

One of the basic shortcomings of existing instrument-flying equipment is that the pilot gets no "feel" for the attitude of his aircraft, and its relation with the ground, targets, obstructions, or landing sites. Common instruments read in the abstracts of thousands of feet, angles of attack, and mach numbers etc., which are still an imperfect substitute, in the most critical phases of flying, for a total visual picture.

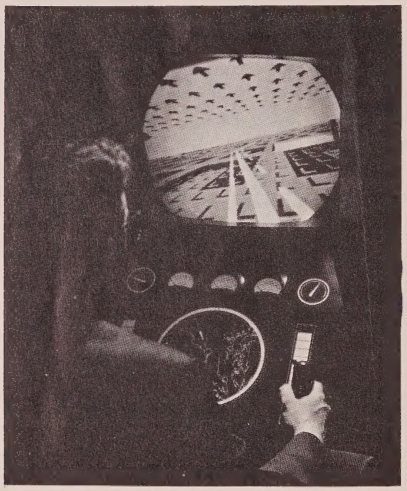
The solution to the problem—a simulated visual picture—has been obvious for a long time, but it has been difficult to translate into hardware. Weight and size cost dearly in aircraft, and the equipment needed to produce a visual picture similar to that which would actually be seen by a pilot are either prohibitively bulky, or expensive.

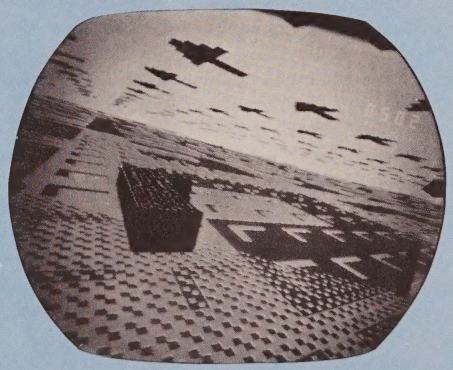
Scientists still haven't licked the weight and cost problem for airborne units, but systems recently delivered to NASA and the Navy by General Electric's Electronics Laboratory are being used right now to train pilots and to help investigate the control and information requirements of tomorrow's spacecraft and aircraft.

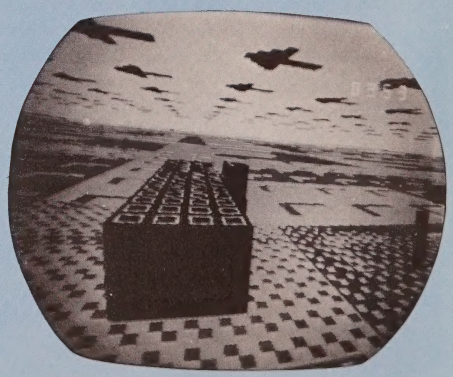
Called a Computed Display, the equipment generates synthetic pictures of the ground, clouds, and other visual references. The pilot sits in a simulated cockpit with a TV screen in front of him. By manipulating the cockpit controls, he feeds altitude, attitude, and speed information to the computer. As he pushes forward on the control stick in a dive maneuver, for example, he sees the earth surface move up rapidly on the TV screen.

By using the computed display, a pilot can fly around obstacles in terrain-avoidance maneuvers, follow a drawn-in flight path to his destination, make weapon runs on simulated targets, or practice takeoff and landing on a runway—all without leaving the ground. "He can even crash a few times, just to get the feel of it," says Harry Mayer, manager of the Electronics Laboratory.

The display system requires only three external inputs: altitude, attitude, and velocity that represent performance of the aircraft being "flown." From this information, the display computer generates a symbolic picture of the ground that is geometrically correct for all







Above, in a simulated cockpit, an engineer "flies" a computer-generated display which follows all of the control movements. The screen simulates the view which would be seen by the pilot if he were actually airborne, with added information, such as white-striped airways. By stored data and proper programming, the system can simulate any fixed wing aircraft

vehicle attitudes. A mathematical model of the ground surface is stored in the display computer. This model is scanned and transformed by the computer according to the laws of perspective to represent correctly the scene at the instantaneous altitude and attitude of the aircraft.

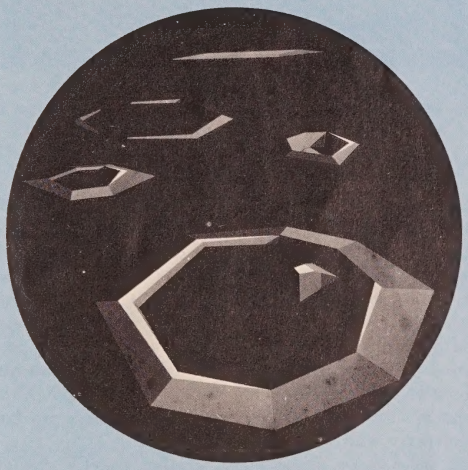
When viewing the earth's surface from a climbing aircraft, natural patterns of a given texture dissolve successively into larger patterns as the altitude increases. As the altitude decreases, the number of small patterns increases.

Symbology can be incorporated in the ground patterns to give the pilot navigational information. For example, if "T's" are used to form the ground texture, directional information can be added by orienting the "T's" with their tops northward.

Computed displays may play an important role in training pilots to fly future military aircraft and spacecraft, as well as future commercial aircraft such as the Supersonic Transport.

To date, all of General Electric's computed displays have been designed as ground-based units, but advances in microelectronic circuits and packaging techniques may ultimately make the size and weight of computed displays compatible with aircraft limitations.

or helicopter. In the sequence of pictures shown, the system approximates the views from the cockpit of an aircraft coming in to land on a carrier at sea. Sky symbols can be made to point north. Sea symbols can indicate wind direction. High speed digital computer operations generate the images at a 30 cps rate, and they maintain exact mathematical perspective for all six degrees of freedom.



The system could also be used to simulate visual images for space flight. A moon vehicle, looking much like a circus clown's face in top artist's conception above, for example, could be simulated for rendezvous missions, or the moon's cratered surface. Below, earth terrain. Note that in all simulated views, there are no rounded lines. The system approximates terrain with images of connected plane surfaces which come closest to fitting the curves of actual terrain. For navigational and training purposes, or to evaluate proposed control systems, this is adequate.

PAY TV: Is the Nickel About to Drop?

Close to wrapping up the 12-year examination, the FCC considers final arguments why and why not PAY TV should get a nationwide stamp of approval.

The FCC's consideration of a nationwide pay-TV system has been one of the longest proceedings on record. It's now been over 12 years since it first began to consider whether or not such a move would be good for the country, but the issue may be approaching the wire. By mid-November, six written statements were filed in the pay-TV case: three by proponents and three by opponents, following up on the 49 comments submitted in October. There are signs that the FCC is about to cut off the writing, and start to wrap up the controversy with final oral hearings.

At stake is the question of whether pay-TV should be given a chance on the premise that it supplements free TV, or whether pay-TV, in fact, can't really deliver enough new material to constitute a public service. There is also the question of what pay-TV competition might do to the free television broadcasting industry.

The networks are generally opposed to the pay-TV idea. Filing comments critical of the concept were the National Association of Broadcasters, the Association of Maximum Service Telecasters, and representatives of a group of theater owners.

Backing pay-TV in formal written statements were Zenith Radio Corp. and Teco, Inc.—both of which have been cooperating in the air test of Zenith's Phonevision system in Hartford, Connecticut; International Telemeter Corp., which conducted a test in Canada of its wired pay-TV system, and Teleglobe Pay TV System, Inc. The tone of the proponents' statements is summed up in the remarks of Zenith President Joseph S. Wright. "The opponents of subscription television—" Wright wrote, "theater owners and some broadcasters—fear this new competition and prefer to restrict the public's program and station choices to those now available." Under the rules suggested by the FCC, subscription television could establish itself only by offering something the public needs and wants. We think members of the public can be trusted to make this decision for themselves by buying the service or rejecting it."

Broadcasters and theater-owner criticism of pay-TV stresses the view that so far, the programs offered to pay-TV viewers have not shown any great improvement in program contents over the free-TV industry. The Zenith-Teco experiment in Hartford, noted the Joint Committee Against toll TV (representing the theater owners), has been underway continuously since 1962, yet the pay-TV operators have not reported on what has happened to the experiment since 1964. "It may very well be," the Joint Committee wrote, "that the proponents are not particularly proud of the programming which was presented during the past two years."

The Teleglobe pay-TV System statement submitted to the FCC claimed "20 years of absolute control of the home screen" for the broadcasting industry, yet, "mediocrity is still the rule and not the exception." The pro-pay-TV interests claim approval of a nationwide system would bring a fresh creative impetus to TV broadcasting.

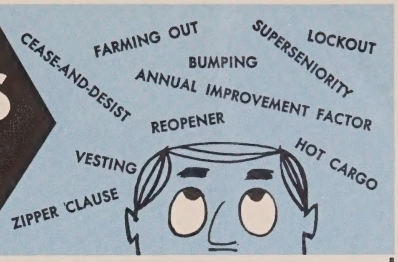
The theater owners' group claims that the experimental pay-TV system operated by International Telemeter Corp. in Canada has been a flop, and that it was abandoned after its viewers lost interest. Telemeter counters with the argument that the experiment was neither designed nor funded to be an example of the best in pay-TV programs but that it was conducted merely to show the potential.

Both Zenith-Teco and Telemeter said that a comparison of the first few years of experimental pay-TV with the "aggregate conventional programming of the three networks, which have had access to the nationwide market," is unfair.

The pay-TV issue impinged also on the controversy over showing of first-run pictures on nationwide free TV. The bad taste which the smash showing of "Bridge on the River Kwai" left with many TV industry personnel is emphasized by the possibilities of pay-TV. In experimental pay-TV operations, films have been the backbone of programming, and the pay-TV proponents point out that one of their main roles could be showing movies long before they can be put on free TV, and that the existence of pay-TV on a greatly expanded basis could help pump more life into the domestic movie industry.

The theater owners Joint Committee suggested that the FCC hold up a final decision on the pay-TV issue until more data is in from the Hartford pay-TV test, and more is learned about the impact of the CATV industry.

A UNION MEMBER'S DICTIONARY



A feature series planned to keep you better informed on the meanings of terms related to collective bargaining, union contracts, and union business. Follow it closely, and your union membership will become more meaningful, and your ability to participate in decisions which affect your future and security will be strengthened.

Major Legislation Affecting Labor

LISTED here are the major pieces of federal legislation dealing with labor:

A

Adamson Act—A 1916 law fixing the eight-hour day as a pay basis for railroad employees, and prohibiting wage cuts because of the shorter work day.

Anti-Injunction Act—The Norris-LaGuardia Act of 1932, which limits the power of federal courts in issuing injunctions in labor disputes. Modified by the Taft-Hartley Act (Labor-Management Relations Act of 1947).

Anti-Racketeering Law — The Hobbs Act of 1934, making it a felony to interfere with commerce by robbery or extortion, by conspiracy or threat of violence.

Anti-Strikebreaker Law—The Byrnes Act of 1936, making it a felony to transport inter-state any person employed to interfere with peaceful picketing, or to block organizing or collective bargaining by violence or threats of violence. Many states and municipalities have since 1960 enacted restrictions on strikebreakers.

Antitrust Acts—See Sherman Antitrust Act and Clayton Antitrust Act.

C

Civil Rights Act of 1964, Title 7—New Federal Fair Employment Practice law, covering all industries affecting interstate commerce. It bars, as of July 1965, discrimination by employers, unions and employment agencies, based on race, color, sex, religion, or national origin. Administered by five-member Equal Employment Opportunity Commission, through informal and formal procedures seeking voluntary compliance, with further recourse to a federal court, permission for the Attorney General to intervene, a court injunction and contempt proceedings. Employers and unions may not discriminate in regard to apprenticeship, training or retraining programs. Employers, unions and employment agencies may not retaliate against any person opposing, making a charge, testifying or taking part in probes or proceedings regarding any practice unlawful under the act, or publishing or printing notices or advertisements indicating discrimination. Employment agencies are forbidden to discriminate by failing or refusing to refer applicants for jobs, or classifying job applicants, on the basis of race, color, religion, sex or national origin. Included in the definition of a "labor organization" are state and local central bodies.

Clayton Antitrust Act—Passed in 1914 and hailed by AFL President Samuel Gompers as labor's Magna Carta. It was in part designed to take labor out from under the Sherman Antitrust Act, and limited the use of labor injunctions by the courts. It was unsuccessful in the latter, due to the interpretations of the courts.

Copeland Act—A 1934 law making it illegal for an employer or his agent to extract a payment as a condition of continued employment.

D

Davis-Bacon—Passed in 1931 to protect local labor wage standards on government construction contracts. It was expanded in 1964 to cover fringe benefits as well. (See Prevailing Wage Law.)

E

Employment Act of 1946—Legislation designed to encourage federal government promotion of full employment. The Council of Economic Advisers is a creature of this law.

Equal Pay Act of 1963—Requires that men and women performing equal work be paid equal wages. Act prohibits lowering of pay for men to equalize rates. Applies to employers and workers covered by the Fair Labor Standards Act.

F

Fair Employment Practices Acts—Laws passed at the state or municipal level to insure employment without consideration of race, creed, national origin or color. These laws were initiated by the Fair Employment Practices Committee set up in 1943 by Executive Order. Fair employment practices were made part of federal law by the Civil Rights Act of 1964.

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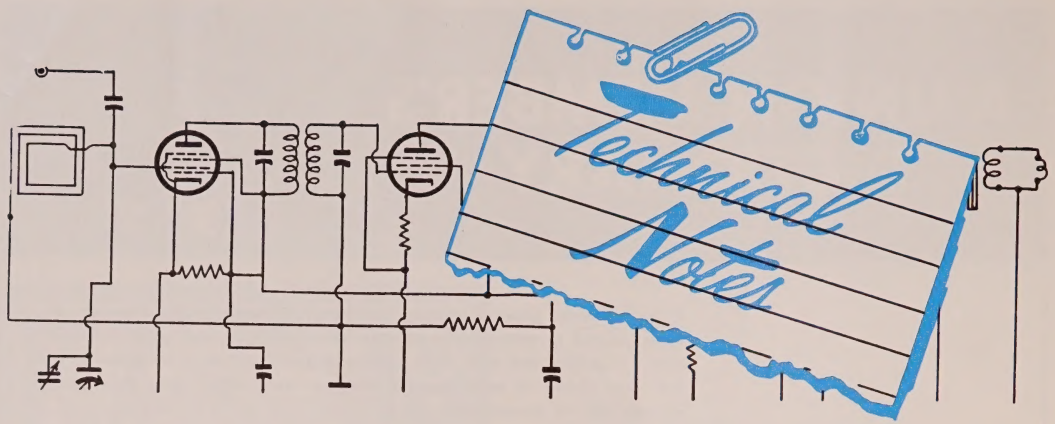


ELECTRIC SPACE PROPULSION

A NASA test of an electric engine prototype designed for long-run propulsion in deep space was recently completed when the cesium fuel exhausted after 341 days. The test marked the longest duration yet for test engines of this type. The engine is an electrostatic thruster, one of three types of electric rocket motors being investigated by NASA for the cruise phase of space flight. Unlike the chemical motors used for launch from earth, electric engines burn for exceptionally long periods of time, under precise control, delivering very little thrust. Once a space ship is in actual space flight, it has already been given the greatest dose of acceleration it needs. The electric engines are expected to result in increased payloads.

The engine which burned for almost a year was an electron bombardment type, in which high voltages are used to accelerate a propellant previously ionized by electrons emitted from a cathode. The other two electronic space engines are the electro-thermal thrustor, in which the propellant is heated and expanded through a nozzle, and the electromagnetic or plasma accelerators which involve interaction between currents within a plasma with electrical and magnetic fields.

Average thrust during the electron bombardment engine test was seven one-thousandths of a pound. A one-kilowatt thrustor was used.

SUPERFAST CAMERA

Using a metal which emits electrons upon exposure to light, a new image tube camera unveiled recently at a high-speed photography congress in Zurich can freeze action which takes place in five hundred-millionths of a second. In the camera tube, one end is coated with the emitting metal, and the other incorporates a screen like a TV receiver. A picture focused on the metal end causes a stream of electrons to flow, forming a picture on the screen. Shuttering is accomplished by switching the power supply on and off rapidly.

SPACE CRASH

It finally happened. Two satellites collided in space. The event took place in 1965, but wasn't revealed until late in 1966 at an international scientific congress in Madrid. The satellites were U. S. vehicles, both launched from the same booster, and this fact undoubtedly kept the collision in the bent-fender instead of total loss category. Two months after the March, 1965 launch, the twin satellites moved together, and were shaken up for a brief period of time, before their gravity-gradient stabilizing systems returned them to normal. Both satellites were travelling at five miles a second, but in the same direction. The accident was a sideswipe instead of a head-on.

DIAL-A-SATELLITE

The Smithsonian Institution in Washington has added a new wrinkle to its charter mission of increasing and disseminating information among man. With the twist of a dial or the punch of a few buttons, you can get the latest report on the population of the more distant reaches over our heads. Just like the weather lady, a reassuring, pleasant voice, recorded, of course, will tell you some interesting things. The satellite report for January 4, 1967, told about the discovery of a new heavenly body, for example:

"The Smithsonian Institution presents your satellite viewing report for Wednesday, January 4. As of today there were 1170 man-made objects reported in space. The total reflects the decay of one piece of U. S. debris. The Echo II satellite crosses the Washington skies tonight at 6:43 p.m., 52 degrees above the northeastern horizon, traveling from the northwest to the southeast.

"The Central Bureau for Astronomical Telegrams located at the observatory notified astronomers around the world of a newly discovered member of our solar system late yesterday. Found by a French scientist, Saturn's tenth moon is the first natural satellite to be discovered since the beginning of the space age. The 100-mile-diameter moon is so faint—a magnitude 14—and so near to the brilliant rings of this mysterious

planet that it was not detectable until the earth passed through the plane of the ring system in December. As the rings became edge-on to the earth, they disappeared—and the moon was recorded on photographic plates taken during this unusual event.

"This recorded report was prepared by the Smithsonian Astrophysical Observatory at Cambridge, Massachusetts."

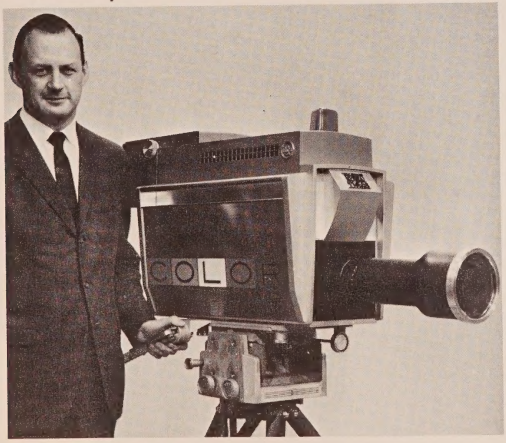
Want to try today's report? Dial Area Code 202, 737-8855.

RCA ANNOUNCES NEW COLOR CAMERA

A new, light weight color TV camera designed for on-the-spot coverage of news, sports and other field pickup events has just been announced by RCA. The TK-44 camera will be commercially available by mid-1968, in time for the Democratic and Republican National Conventions, and a prototype will be demonstrated at the NAB Convention in Chicago, in April.

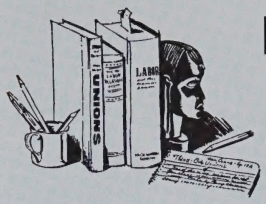
Weighing approximately 135 pounds, less detachable viewfinder and lens, the camera is said to combine ease of handling and operation. It follows RCA's design concept of a high-quality, separate luminance channel. It employs a three-inch image orthicon for the luminance signal and the red, green and blue channels will use one-inch electrostatic focus tubes of the vidicon type.

For the flexibility of set-up and operation needed in field equipment, the new camera's major control functions are located at the video operator's position. It also features a simplified optical system, with no field or relay lens in the luminance channel and will accommodate a variety of zoom lenses, either manually or automatically controlled.



DEAD WRONG!

Telephone misdials make strange bedfellows, and perhaps none stranger than the Wichita, Kans. confusion produced by dial numbers just one digit apart. After noting a high percentage of lukewarm responses, and even rude disconnects, to a cheerful "body shop" phone answer, the automotive repair firm found out what was wrong. The almost identical phone number belonged to a Wichita funeral home.



READING TIME

Review of Current Books on Labor, Broadcasting & Recording

Amplifier Handbook; *by a staff of specialists under Editor-in-Chief Richard Shea. Published by Mc-Graw-Hill Book Company, 330 West 42nd street, New York, N. Y. 10036. 1,476 pages, $37.50.*

This is a reference work of encyclopedic proportions, bringing together in one source a mass of information on almost every type of amplifying device and the circuits in which they are incorporated. Current information on lasers, tunnel diodes, nonlinear amps, microwave amps, ceramics and analog forms of integrated circuits is included.

The handbook is divided into three logical sections—Amplifier Fundamentals, Amplifying Devices, and Amplified Circuits. In the first section, a concise treatment of fundamental network theory is presented, with particular emphasis on its application to amplifier design and theory. Section 2 describes all major forms of amplifying devices, including tubes, transistors, magnetic devices, ceramic devices, ionic devices, various forms of semiconductor devices other than transistors, and induced emission devices. The section on circuits covers practically every form of amplifier from dc to laser, from microwatts to megawatts, using all forms of devices described in section 2.

Amplifier Handbook contains a profusion of reference materials—tables and data, design information which includes typical circuits, and basic theory. Sufficient design material is included to permit design of other circuits, differing from the specific designs included.

Radio Handbook, 17th Edition; *published by Editors and Engineers Limited, New Augusta, Indiana, 46268. 832 pages, hardbound, $12.95.*

Aimed specifically at the engineer and technician in addition to the advanced amateur, this recent issue of an old favorite combines nuts-and-bolts construction data with more sophisticated basic theory and reference data to make circuitry design or modification faster. All kinds of radio communications equipment are covered, with enlarged sections on single-sideband equipment and design and semiconductors; r-f feedback amps, and special vacuum-tube and transistor circuits. Completely revised, updated, with some data on industrial and military electronics. Special attention has been paid to reducing TVI on equipment described in construction chapters.

STATION BREAKS

CATV ISSUE BACKFIRES

Now that the landmark New York court case decision put the mantle of responsibility for copyright respect on CATV systems, some CATV operators are using the decision in attempts to sneak out from under mandatory carrying of local station programs. Berks TV Cable Co., of Reading, Pa., says the FCC should not support the local station's demand that its signal be carried by the CATV system, unless the station "absolves" the CATV of liability for possible infringement of the station's rights.

A NEW INDUSTRY

Developing into a technology all of its own is computer time sharing—tying a number of customers to one central computer system via local Transmit/Receive units and telephone lines. The FCC has begun a study of the subject, and hopes to write the regulatory rule book, before the industry matures. Although time sharing has been around for a while, in such applications as university scientific research and retail store credit checking, some forecasters think time sharing could develop into a new kind of "utility." A critical issue, of course, is who, if anyone, will set rates, and it's almost a foregone conclusion that sooner or later someone will.

There's also an industry battle shaping up over who's going to build and sell what parts of the system. Included are the computers and their peripheral input-output devices which tie them in to phone lines; keyboard terminals, and related equipment.

SNEAKY . . . SNEAKY

You may have seen them—"integrated" commercials shared by two sponsors, giving them the same prime spot time at half price. Some of them work very nicely together, such as sandwich bags and sandwich makings, but broadcasters don't seem to be biting on the idea. Many stations already refuse to accept the ads, some are quivering on the brink of a decision.

FCC LATERALS CATV RULES CHANGE

Deferring to Congress, the FCC refused in early January to make any major changes in its CATV regulation rules, although it did make minor concessions. The Commission says that any changes it might make now, tied up with the copyright issue as most of them are, could be superseded as soon as Congress passes a copyright revision law.

Minor concessions were made with respect to rules requiring wire TV to carry the signals of local stations, providing some protection to local stations for non-duplication of programming and piping distant signals into the top 100 markets.

Congress made detailed copyright revision proposals last year, but none got to the floor for a vote.

TV IN THE HOUSE?

Rep. Claude Pepper (D-Fla.) is the latest Congressman to endorse the idea of letting the TV camera sit in on House committee hearings. The Senate now permits TV coverage of hearings, of course, at the discretion of the chairman. This has been a king-maker for Senators ramrodding popular investigations, yet the House is still reluctant to even let radio in. A growing number of members, however, think it would be healthy (and perhaps politic). Rep. Pepper says "we cannot afford to exclude the American people from this cornerstone of our democratic government."

ROLAND KISSLER
BOX 956
MOSES LAKE WASH
98837
77